

NASIRIYAH FIRE STATION
NASIRIYAH, IRAQ

SIGIR PA-06-053
JULY 24, 2006

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SPECIAL INSPECTOR GENERAL FOR IRAQ RECONSTRUCTION

July 24, 2006

MEMORANDUM FOR COMMANDING GENERAL, MULTI-NATIONAL FORCES -
IRAQ
COMMANDING GENERAL, GULF REGION DIVISION,
U.S. ARMY CORPS OF ENGINEERS
DIRECTOR, IRAQ RECONSTRUCTION MANAGEMENT
OFFICE

SUBJECT: Report on Project Assessment of the Nasiriyah Fire Station, Nasiriyah, Iraq
(Report Number SIGIR-PA-06-053)

We are providing this project assessment report for your information and use. We assessed the design and construction work being performed for the Nasiriyah Fire Station, Nasiriyah, Iraq to determine its status and whether intended objectives will be achieved. This assessment was made to provide you and other interested parties with real-time information on a relief and reconstruction project underway and in order to enable appropriate action to be taken, if warranted. The assessment team included an engineer and an auditor.

The comments received from the Commander, Gulf Region Division-Project and Contracting Office, U.S. Army Corps of Engineers, in response to a draft of this report addressed the recommendations, and the actions taken and planned should correct the issues we identified. As a result, comments on this final report are not required.

We appreciate the courtesies extended to our staff. This letter does not require a formal response. If you have any questions please contact Mr. Brian Flynn at (703) 604-0969 or brian.flynn@iraq.centcom.mil or Mr. Andrew Griffith, P.E., at (703) 343-9149 or andrew.griffith@iraq.centcom.mil.

Stuart W. Bowen, Jr.
Inspector General

Special Inspector General for Iraq Reconstruction

SIGIR PA-06-053

July 24, 2006

Nasiriyah Fire Station, Nasiriyah, Iraq

Synopsis

Introduction. This project assessment was initiated as part of our continuing assessments of selected sector reconstruction activities for Facilities and Transportation. The overall objectives were to determine whether selected sector reconstruction contractors were complying with the terms of their contracts or task orders and to evaluate the effectiveness of the monitoring and controls exercised by administrative quality assurance and contract officers. We conducted this project assessment in accordance with the Quality Standards for Inspections issued by the President's Council on Integrity and Efficiency. The assessment team included a professional engineer and an auditor.

Project Assessment Objectives. The objective of this project assessment was to provide real-time relief and reconstruction project information to interested parties in order to enable appropriate action, when warranted. Specifically, we determined whether:

1. Project components were adequately designed prior to construction or installation;
2. Construction or rehabilitation met the standards of the design;
3. The Contractor's Quality Control plan and the United States Government's Quality Assurance program were adequate;
4. Project results were consistent with original objectives; and
5. Project sustainability was addressed.

Conclusions. The assessment determined that:

1. The contractor's design was not complete and lacked sufficient detail. The contract statement of work required the contractor to design and build the fire station based on the floor plan layouts provided by the government. In reviewing the contract documentation, we did not find any record of the design review and approval by the Project and Contracting Office or the United States Army Corps of Engineers, Gulf Region South District. The contractor's design package included architectural, plumbing, electrical and structural drawings and specifications. However, the architectural, plumbing, and electrical drawings provided only basic information such as functional layout and space configuration. The specifications contained a one page listing of suppliers of materials and equipment, which did not make any reference to the qualitative requirements for materials and workmanship on the project.
2. The assessment team did not visit the project site because security officials at the Gulf Region South determined it not safe to travel there. Therefore, the evaluation of the project construction was based on a review of the contract files including, quality assurance reports and progress photos, and our interviews with the United States Army Corps of Engineers, Resident Office staff. We determined the construction fulfilled the requirements of the contract's statement of work. When problems were encountered with the quality of construction, the United States Army Corps of Engineers, Resident Office staff quickly identified

the deficiencies and actively managed the contractor's corrective actions until the deficiencies were corrected. As a result, the project provided the Iraq Civil Defense Directorate with a functional fire station in Nasiriyah.

3. The contractor's Quality Control plan was sufficiently detailed to effectively guide the contractor's quality management program. Further, the contractor's daily Quality Control reports contained required project and work activity information to document construction progress and identify problems and required corrective action.

The Government Quality Assurance program was effective in monitoring the contractor's quality control program. The Project Engineer and the Iraqi Quality Assurance Representative ensured that all deficiencies cited during quality assurance inspections were corrected. The Iraqi Quality Assurance Representative maintained daily quality assurance reports that contained project-specific information to document construction progress and highlight deficiencies. In addition, the Iraqi Quality Assurance Representative supplemented the daily reports with detailed photographs that reinforced the narrative information provided in the reports.

4. The Nasiriyah Fire Station project results were consistent with the original contract objective, resulting in a functional fire station for the Iraq Civil Defense Directorate. Even though the design was insufficient, the United States Army Corps of Engineers capably managed the project. They provided effective project oversight and construction management to ensure the constructed facility met the statement of work requirements.
5. Sustainability was addressed in the contract requirements. The contract specifications required the contractor to provide and certify warranties in the name of the appropriate Ministry, for all equipment, which includes any mechanical, electrical and/or electronic devices, and all operations for 12 months after issuance of the Taking-Over-Certificate. The contractor was to provide any other commonly offered extended warranties for equipment and machinery purchased. In addition, the contractor was to provide a one-year warranty on the materials and workmanship for the buildings and facilities constructed in this project. The contractor was to complete all inspection and commissioning requirements prior to the final inspection.

Recommendations. United States Army Corps of Engineers, Gulf Region Division should:

- Ensure the adequacy of the design; and
- Maintain a record of the design review and approval process.

Management Comments. The Gulf Region Division concurred with the conclusions and recommendation contained in the draft report. In addition, the Gulf Region Division provided additional information based on their review of the draft report.

Evaluation of Management Comments. SIGIR reviewed and noted comments from the Gulf Region Division. Based on comments provided by Gulf Region Division, several minor changes were incorporated into the final report to reflect the updated information provided by Gulf Region Division.

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Introduction

Objective of the Project Assessment

The objective of this project assessment was to provide real-time relief and reconstruction project information to interested parties in order to enable appropriate action, when warranted. Specifically, we determined whether:

1. Project components were adequately designed prior to construction or installation;
2. Construction or rehabilitation met the standards of the design;
3. The Contractor's Quality Control plan and the United States Government's Quality Assurance program were adequate;
4. Project results were consistent with original objectives; and
5. Project sustainability was addressed.

Pre-Site Assessment Background

Contract, Task Order, and Costs

The Nasiriyah Fire Station project was completed under Contract W917BK-05-C-0008, dated 27 January 2005, a firm-fixed price contract, for \$508,800. The contract was between the United States Army Corps of Engineers (USACE) Gulf Regional Division – Southern District (GRS) and Al Ratba'a General Contracting Company, Basrah, Iraq. Contract W917BK-05-C-0008 called for the construction of a fire station that can accommodate 20 firefighters and 11 daytime administrative staff members.

There were three modifications to the contract W917BK-05-C-0008. Modification #A00001, issued 4 July 2005, extended the contract duration from 90 calendar days to 240 calendar days. The contract completion date shall be extended an additional 150 days, from 15 May 2005 to 12 October 2005. The contract price remained unchanged.

Modification R0002 was a no cost change modification that included additional work for liquidated damages. Modification R0004 was a no cost change to modification R0002 that extended the contract completion date by 179 days and established a closeout date of 08 April 2006.

Project Objective

The scope of work provided by the USACE stated the overall objective of this contract was to construct a fire station in Nasiriyah, Iraq to accommodate 20 firefighters and 11 daytime administrative staff members.

Description of the Facility (preconstruction)

The description of the facility (preconstruction) was based on information obtained from the contract and the USACE project file. Prior to construction, the Nasiriyah fire station site was a vacant lot in the northwestern edge of the city of Nasiriyah approximately three kilometers (km) north of the Euphrates River. The site is in a residential area within Nasiriyah. The city of Nasiriyah is located on an alluvial

plain and the topography of the fire station site is level. The site does not drain very well since it is relatively flat. Site Photo 1 shows standing storm water runoff in front of the fire station site. The city street is located approximately 125 meters (m) away from the fire station.



**Site Photo 1. Standing water on the front side of the of the fire station –
Photo provided by USACE**

Scope of Work of the Contract

Based on the contract scope of work, the following major tasks for the Nasiriyah Fire Station included construction of:

- A fire station consisting of:
 - Garage space for three fire trucks and two sport utility vehicles (SUVs) with manual doors
 - Two office rooms to accommodate 10 personnel
 - Berthing areas for 20 firefighters
 - Shower and bathroom facilities
 - Training room for 30 people
 - Storage rooms for equipment
 - Commercial grade kitchen, food storage, and dining areas
- Electricity, water, and sewer connections as well as installation of an emergency generator
- Communication radio tower and communication center
- Perimeter security fencing with main entrance and guard shack
- Security lighting around building

The Scope of Work did not contain a driveway from the city street to fire station. The front of the fire station building site is approximately 125 m from the city street. Without a road, the trucks would have no paved access to and from the fire station.

While there was no paved access road accomplished on the project, the contractor did agree to install a sub base road (i.e. gravel road) at the request of the local fire chief from the Iraqi Civil Defense Directorate. In addition, the contractor had installed additional security fencing (340 m²) on the project site at the fire chief's request to enclose the fire station site. The USACE Resident Office considered the sub-base road and extra fencing to be additional work, not part of the contract

requirements. Instead of paying the contractor for the added work, the USACE Resident Office used the value of the sub-base road construction and additional fencing to offset the 115 days of liquidated damages (valued at \$19,200) incurred by the contractor for failing to complete the project on the prescribed completion date. Modification R0002 was a no cost change modification that included additional work (fencing and gravel road) to offset the liquidated damages.

Current Project Design and Specifications

The contract required project architectural and engineering services to include design submittals and approvals. Prior to the contractor beginning the design, the contractor was provided by USACE a generic three level fire station floor plan to use as the basis of design, which included:

- Individual room layout and dimensions
- Door and window location
- Stair location and configuration
- Column spacing
- Bathroom fixture layout
- First level fire truck parking layout

The USACE floor plan required a 26.5 m by 18.2 m three-level building with two enclosed exterior stairways on each side of the building. The first level contained the parking area for two sport utility vehicles and three fire trucks, as well as a reception room, and rooms for storage and gear. In addition, the first level included a locker room and a room for drying equipment and gear. The next level contained a mezzanine area, which included separate men's and women's bathrooms, and additional storage areas. The living quarters, kitchen, dining area, and training room were shown on the third level floor plan. In addition, the third level contained bathrooms and showers for the firefighters, office space, and a separate bedroom and bathroom for the fire chief.

The contractor prepared the design based on the USACE provided floor plan drawings. The contractor's design package furnished to us by the USACE Resident Office contained architectural, plumbing, electrical, and structural drawings and specifications. The contractor's design followed the prescribed floor plan layouts. However, in assessing the contract documentation, we did not find any record of the design review and approval by the Project and Contracting Office (PCO) or USACE. Additionally, based on our review of the contractor's design, we determined it was not complete and lacked sufficient detail as described below.

- **Exterior wall construction.** The design drawings do not contain details showing the exterior wall construction, or how the walls are tied to the structural members, or other interior walls.
- **Lintel construction.** There are no details showing typical lintel construction.
- **Window and door details.** Other than the elevations of each type of door and window, the design contained only one installation detail for windows on the Front Elevation (Sheet 289).
- **Roofing system.** The drawings do not include a cross section of the roof components and their cross sectional thicknesses or the flashing detail along the parapet.

- **Stair details.** The architectural drawings show two sets of stairs with different dimensions, yet there is only one stair detail showing a cross section with reinforcing steel requirements. Further, the stair detail contained on the drawing titled “Ladder” (sheet 276) shows the landings supported by a 240 millimeter thick masonry wall. There is no detail showing how the stairs are anchored to the masonry wall or to the adjoining column. Further, since there are no details in the drawings for the masonry wall construction, it is not known whether the walls supporting the stairs are reinforced.
- **Water and sanitary systems.** There is no information on the drawings showing pipe size, connection details, valve location, or pump location for the water supply or sanitary system. Additionally, there are no connection details for the water tanks and the pumps. The current sanitary and water supply drawings are conceptual line diagrams.
- **Bathroom and shower facilities.** The scope of work requires appropriate shower facilities for female staff members. The design drawings show a female locker room on the Mezzanine Floor Plan (Drawing No. 254) with two wash basins and two water closets. Showers are not shown on the plan.
- **Electrical distribution system.** There are no drawings on the electrical distribution system other than relative location of electrical outlets, switches, lighting fixtures, ceiling and exhaust fans, and window air conditioning units in each room. The design does not contain a single line diagram showing connection information from the generator to the building’s main distribution panel and to the sub panels on each level. Also, the design does not show any details regarding electrical grounding.
- **Specifications.** The contract scope of work required the contractor to submit specifications. The specifications provided to the assessment team by the USACE Resident Office contained a one page listing of suppliers of materials, which did not make any reference to qualitative requirements for materials and workmanship on the project. For example, for the masonry, the specification listed the following: “*Clay bricks are Iraq Meesan Governate origin*” and “*Thermostone bricks are Iraq Basarh Governate made.*”

Based on the contract requirements, the design drawings and technical specification submitted by the contractor were incomplete.

Site Assessment

Security concerns prevented the assessment team from visiting the Nasiriyah Fire Station. The SIGIR Satellite Imagery Group located in Washington, DC provided the assessment team with satellite imagery of the area and construction site. This provided a general overview of the site and the progress of the construction and areas of potential concern. Therefore, our project assessment for the fire station project relied primarily on information from the contract files and interviews with the USACE Area Engineer, Resident Engineer, and Project Engineer.

At the time of our interviews with the USACE staff, the fire station construction was completed and was turned over to the Iraq Civil Defense Directorate (ICDD) on 8 April 2006. Site Photo 2, taken in March 2006, shows the front of the fire station one month prior to final acceptance of the project. The original scope required manual doors for the

truck and SUV parking areas. However, based on the preferences expressed by the ICDD to remove the doors from the scope of work, the USACE opted for an “open” parking area as seen in Site Photo 2.



**Site Photo 2. Fire station one month before turnover to Iraq Civil Defense Directorate
Photo provided by USACE**

In assessing the fire station project, we reviewed the completed construction on the project. We focused on the structural, architectural, mechanical, and electrical components of the fire station building. The basis for the assessment is the information provided to the team in the interviews and from the contract files. Information contained in the contract files included: the design drawings, the USACE quality assurance reports and photographs, contractor quality control reports, and correspondence between the Resident Office and the contractor.

Work Completed

Structural

The design required a structural concrete frame with a reinforced concrete roof and floor slabs, beams and columns, supported by a spread footing foundation. Based on a review of the contract file, there were some problems with the quality of workmanship on the concrete construction early in the project. An inspection report by USACE GRS engineers, dated 1 September 2005, revealed problems with the structural concrete. Specifically, the USACE GRS design engineer noted:

“The cast-in-place columns, beams and slabs where fresh concrete is exposed show indications of improper placement of reinforcing steel with insufficient overlap on the steel bars to provide load transfer; poor quality control on concrete mix preparation, placement, vibration, and curing; and generally poor construction practices that may result in loss of vertical and horizontal control.”

Site Photos 3, 4, and 5 provide examples of some of the concrete problems, such as segregation, poor quality workmanship, and insufficient length of overlapping reinforcement.



**Site Photo 3. Segregated concrete on stairs due to improper placement –
Photo provided by USACE**



**Site Photo 4. Hole in concrete beam above pipe sleeve; also segregated concrete on bottom of
beam – Photo provided by USACE**



Site Photo 5. Improper placement of reinforcing steel with insufficient length along at a stair landing - Photo provided by USACE

Subsequent to the inspection, the USACE GRS contracting officer issued a stop work order, dated 2 September 2005, because of the concerns regarding the structural integrity of the fire station.

The contractor met with USACE GRS personnel and submitted a plan for correcting the problems. The contractor's plan, approved by USACE on 24 September 2005, included the removal and replacement of deficient concrete stairs. In addition, the plan included the use of an epoxy patching material to repair the voids and areas of segregated concrete. Based on a review of the USACE Quality Assurance Representative's (QAR) deficiency log, the concrete deficiencies noted in the stop work order were corrected by January 2006.

Site Photo 6 shows part of the structural frame supporting the third level after repairs to structural concrete had been completed and during the painting phases. The reinforced concrete beams' cross sectional dimensions are 400 mm by 650 mm. The reinforced concrete columns' cross sectional dimensions are 400 mm by 400 mm. If there were voids in the concrete, the contractor filled them using the epoxy patching material. After patching, the contractor applied a cement-sand plaster mix to the concrete surfaces prior to painting the surfaces.

In addition, the contractor replaced reinforced concrete stairs as directed by USACE. After the new stairs were in place and properly cured, the contractor placed terrazzo tile on the stair risers and treads. The other exposed surfaces of the stairs were finished with cement-sand plaster. The design for the stairs required each step to have a 300 mm run and 170 mm rise. Site Photo 7 shows one section of a set of stairs, after the stairs were painted and tile was placed. The rise and run dimensions appear to meet the dimension requirements in the design.



Site Photo 6. Reinforced columns and beams supporting level 3 – Photo provided by USACE



Site Photo 7. Concrete stairs at ground level – Photo provided by USACE

Architectural

According to the wall section detail shown on the front elevation, drawing number 289, the wall thickness is 24 mm. The contract bill of quantities specified solid bricks to be used for constructing masonry walls. Based on a review of the

construction progress photos, the contractor utilized bricks (Site Photo 8) and block (Site Photo 9) to construct masonry walls. The drawings did not specify the type of bricks required for the construction of the block walls.



Site Photo 8. Exterior brick walls on third level – Photo provided by USACE



Site Photo 9. Block wall on mezzanine level – Photo provided by USACE

During the course of construction, the USACE QAR did identify poor workmanship in constructing one of the exterior walls. According to the Quality Assurance (QA) Deficiency Log, the wall shown in Site Photo 10 was identified as a problem in December 2005. Two weeks later, the deficiency had been corrected and the wall replaced.



Site Photo 10. Poorly constructed wall reconstructed after direction from USACE – Photo provided by USACE

Also, the contractor failed to construct exterior walls at ground level on each side of the fire station. The USACE QAR discussed the missing non-load bearing walls with representatives of the ICDD, and the ICDD reported that the walls were not necessary. Since the walls were not load bearing, the walls were omitted from the contract requirements. The omitted walls on each side of the building are shown in Diagram 1.

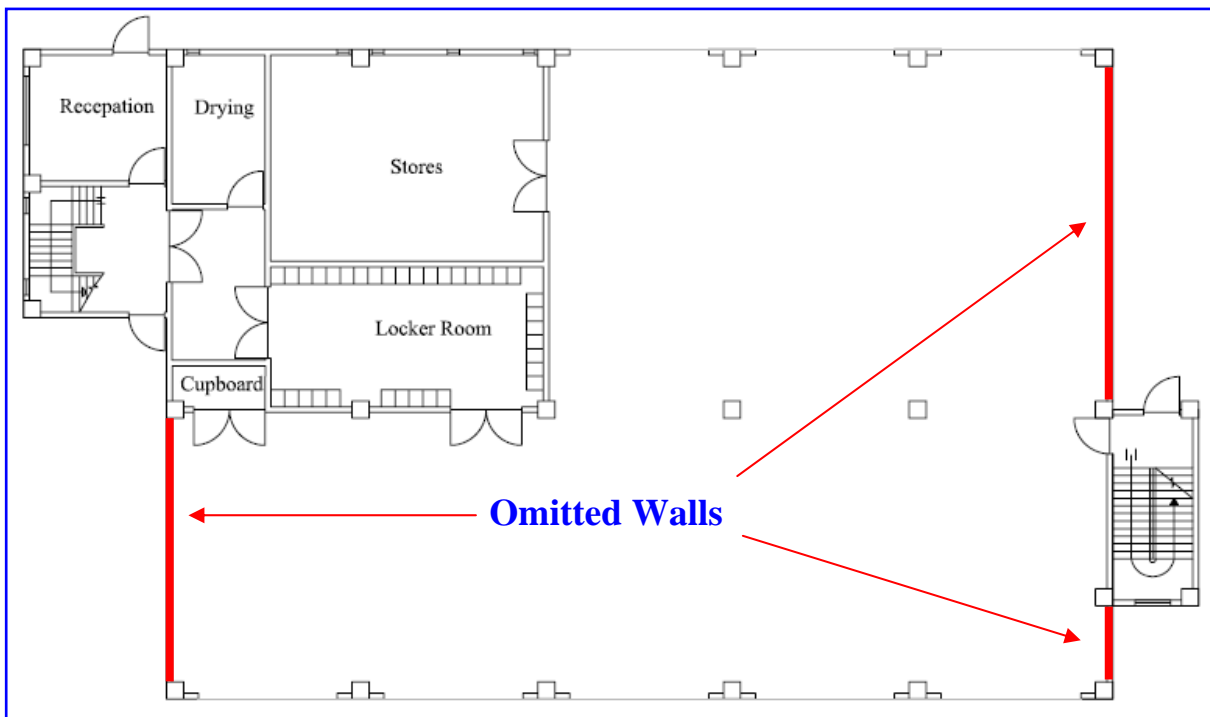


Diagram 1. Ground floor plan showing location of exterior walls not constructed

For finishing the exterior and interior walls and ceilings, the bill of quantities listed plastering and painting. The bill of quantities required the plastering of exterior walls with a sand cement mortar and the interior walls and ceilings with a gypsum plaster. For flooring, the contractor installed terrazzo floor tile in all areas except for the kitchen and bathroom areas, where ceramic tile was utilized. In addition, ceramic tile was used on the showers and water closet walls, as well as on the other wall surfaces in the bathrooms. In the kitchen, as shown in Site Photo 11, the contractor placed ceramic tile on the walls to a height equal to the top of the window.



Site Photo 11. Kitchen with ceramic tile wall covering

Another architectural feature in the building inherent with fire stations is the fireman's pole. The contractor's design showed a four inch diameter steel pole to provide direct access to the ground floor level from the living areas on the third level. Site Photo 12 shows two perspectives of the completed fireman's pole and the opening through the floor slab.



Site Photo 12. Top and bottom perspective of the fireman's pole

Based on our review of the QAR and the USACE progress photos, the construction of architectural features in the fire station appeared adequate. The QA Deficiency Log noted a few items associated with architectural work such as repainting and the setting of floor tile, which according to the USACE, were corrected by the contractor.

Mechanical (Water Supply, Plumbing, Heating, Ventilation and Air Conditioning)

The contract design required two water storage tanks, each with a capacity of 10 cubic meters (m^3) to be constructed at the ground level on one side of the station. In addition, the design included eight, one m^3 roof top water tanks. Through a review of the construction progress photos, we verified the installation of the two ground level tanks, and five roof top tanks, although we could not determine their capacity. Site Photos 13 and 14 show the two types of water tanks installed at the fire station.



**Site Photo 13. Surface level 10 m^3 water tanks –
Photo provided by USACE**



**Site Photo 14. Roof top water tanks –
Photo provided by USACE**

The design drawings showed a third level locker room for males with space for lockers, as well as five toilets, five wash basins, and five showers. In addition, the design included a mezzanine level female locker room that included lockers, two washbasins, and two toilets. On the third level, the fire chief's bedroom contained a bathroom with a washbasin and toilet. Based on the review of the QA reports and the QA deficiency log, there were no issues regarding the construction of the bathroom and shower facilities, including the plumbing and installation of the bathroom fixtures.

The design required two sizes (1.5 and 2 ton) of window type heating, ventilation and air conditioning (HVAC) units for the fire station. There were no details in the design drawings showing the wall opening or installation requirements. However, review of the QA information indicated no discrepancies in their installation. Site Photo 15 shows two window HVAC units installed in the fire house.



**Site Photo 15. Window type HVAC units on third level of the fire station –
Photo provided by USACE**

Electrical (Generator and Distribution Panels)

The design drawings required a 50 kilovolt amp generator to be located adjacent to the building on a concrete pad. Site Photo 16 shows an “F. G. Wilson” generator, model P50E1 installed at the fire station. The assessment team reviewed the catalog cut information provided by the USACE PE, and verified the generator met the contract requirements.



Site Photo 16. Generator installed at the fire station – Photo provided by USACE

According to the electrical plans, one miniature circuit breaker distribution board with 100 amp service was required on each floor. Other requirements shown on the electrical plans included 13, 15, and 20 amp electrical outlets, exhaust fans, fluorescent light fixtures, 125 watt flood lights, light switches, ceiling fans, and switches. Although we could not verify every electrical device, the most recent progress photos provided by USACE indicate the contractor installed circuit breaker

distribution boards, ceiling fans, electrical outlets, flood lights, fluorescent lights, and switches.

Work in Progress

All field work was reported complete at the time of the assessment.

Work Pending

All field work was reported complete at the time of the assessment.

Project Quality Management

Contractor's Quality Control Program

The Nasiriyah Fire Station contract W917BK-05-C-0008 specified that the contractor was to perform all quality control throughout the duration of the design, construction, installation, testing, and commissioning. The contractor submitted a quality control (QC) plan that was approved by USACE on 12 February 2005. The plan addresses the QC organization, inspections, nonconforming items, testing and test plans, submittal procedures, reports and records, material handling and storage. In addition, the plan included a list of the definable features of work. We determined the contractor's QC plan met the standards addressed in Engineering Regulation 1180-1-6 (*Construction Quality Management*) or PCO Standard Operating Procedure CN-103 (*Contractor Construction Quality Control Plan*).

The contractor shall implement and maintain a construction daily report (CDR) to include all pertinent project construction and site activities. The contractor submitted QC reports on a daily basis, which were reviewed by the Iraqi QAR and Project Engineer. These reports contained information such as work accomplished each day with the location, activity and by whom, test results, labor distribution, equipment utilized, and material received on site. In addition, the contractor prepared daily inspection checklists for each definable feature that was scheduled to be worked on each day. The contractor did not maintain deficiency logs to document problems noted with construction/renovation activities.

Government Quality Assurance

The USACE Iraqi Quality Assurance Representative (QAR) maintained daily QA reports that documented any deficiencies noted at the site. Based on our review, we found the Iraqi QAR's reports to be sufficiently complete, accurate, and timely. In addition to containing project specific information to document construction progress and highlight deficiencies, the Iraqi QAR supplemented the daily reports with detailed photographs that reinforced the narrative information provided in the reports. The USACE Iraqi QAR did maintain a QA deficiency log, and the Project Engineer ensured that the deficiencies cited during QA inspections were corrected.

The Iraqi QAR was on site and managed the project at the fire station. The Iraqi QAR spent time at the project site interacting with the contractor and observing construction activities. Further, the Iraqi QAR ensured that potential construction deficiencies were detected, evaluated, and properly corrected, in a timely manner.

The Government Quality Assurance program was effective in monitoring the contractor's Quality Control program for the Nasiriyah Fire Station construction

project. In addition, QA activities were sufficiently and accurately documented. This condition occurred due to the efforts of the Project Engineer and Iraqi QAR, during the course of the project.

Project Sustainability

The contract specifications required the contractor to provide and certify warranties in the name of the appropriate Ministry, for all equipment, which includes any mechanical, electrical and/or electronic devices, and all operations for 12 months after issuance of the Taking-Over-Certificate. The contractor was to provide any other commonly offered extended warranties for equipment and machinery purchased. In addition, the contractor was to provide a one-year warranty on the materials and workmanship for the buildings and facilities constructed in this project. The contractor was to complete all inspection and commissioning requirements prior to the final inspection.

Another issue that could impact sustainability is the poor drainage around the fire station. The Nasiriyah Fire Station site is level. The site does not drain well since it is relatively flat, and the city street is located approximately 125 meters (m) away from the fire station. Site Photo 17 shows standing storm water runoff in front of the fire station site. During an interview, the USACE stated that the contractor provided the fire station with an entryway that has sub-base materials, but the project did not address drainage.



Site Photo 17. Standing water – Photo provided by USACE

Conclusions.

Based upon the results of our site visit, we reached the following conclusions for assessment objectives 1, 2, 3, 4, and 5. Appendix A provides details pertaining to Scope and Methodology.

1. Determine whether project components were adequately designed prior to construction or installation.

The contract statement of work required the contractor to design and build the fire station based on the floor plan layouts provided by the Government. The contractor's design package furnished to the assessment team by the USACE Resident Office contained architectural, plumbing, electrical and structural drawings, and specifications. However, based on our review of the contract documentation, we did not find any record of the design review and approval by the Project and Contracting Office or the U.S. Army Corps of Engineers Gulf Region South District. Additionally, we determined it was not complete and lacked sufficient detail. The architectural, plumbing, and electrical drawings provided only basic information, such as functional layout and space configuration. The specifications contained a one page listing of suppliers of materials, which did not make any reference to qualitative requirements for materials and workmanship on the project.

2. Determine whether construction met the standards of the design.

The assessment team did not visit the project site because security officials at the Gulf Region South determined it not safe to travel there. The evaluation of construction work was based on a review of the contract files, including quality assurance reports and progress photos and interviews with USACE Resident Engineer staff. Although the design was not adequate, the construction fulfilled the requirements of the contract's statement of work. When there were problems encountered with the quality of construction, the USACE Resident Office staff quickly identified the deficiencies and actively managed the contractor's corrective actions until the deficiencies were corrected. As a result, the project is providing the Iraq Civil Defense Directorate with a functional fire station in Nasiriyah.

3. Determine whether the Contractor's Quality Control plan and the Government Quality Assurance Program were adequate.

The contractor's Quality Control plan was sufficiently detailed to effectively guide the contractor's quality management program. Further, the contractor's daily Quality Control reports contained required project and work activity information to document construction progress and identify problems and required corrective action.

The Government Quality Assurance program was effective in monitoring the contractor's quality control program. The Project Engineer and the Iraqi QAR ensured that all deficiencies cited during QA inspections were corrected. In addition, the Iraqi QAR maintained daily QA reports that contained project-specific information to document construction progress and highlight deficiencies. Also, the Iraqi QAR supplemented the daily reports with detailed photographs that reinforced the narrative information provided in the reports.

4. Determine whether project results were consistent with original objectives.

The Nasiriyah Fire Station project results were consistent with the original contract objective, resulting in a functional fire station for the Iraq Civil Defense Directorate.

Even though the design was insufficient, the project was capably managed by the U.S. Army Corps of Engineers Resident Office staff. They provided effective project oversight and construction management to ensure the constructed facility met the statement of work requirements.

5. Determine if project sustainability was addressed.

Sustainability was addressed in the contract requirements. The contract specifications required the contractor to provide and certify warranties in the name of the appropriate Ministry, for all equipment, which includes any mechanical, electrical and/or electronic devices, and all operations for 12 months after issuance of the Taking-Over-Certificate. The contractor was to provide any other commonly offered extended warranties for equipment and machinery purchased. In addition, the contractor was to provide a one-year warranty on the materials and workmanship for the buildings and facilities constructed in this project. The contractor was to complete all inspection and commissioning requirements prior to the final inspection.

Recommendations.

In future projects, the U.S. Army Corps of Engineers Gulf Region Division should:

- Ensure the adequacy of the design; and
- Maintain a record of the design review and approval process.

Management Comments.

The Gulf Region Division concurred with the conclusions and recommendation contained in the draft report. In addition, the Gulf Region Division provided additional information based on their review of the draft report. This additional information including their response to the SIGIR recommendations, and SIGIR's evaluation of the Gulf Region Division's comments are contained below.

Evaluation of Management Comments.

1. **Draft Report.** Nasiriyah Fire Station, Nasiriyah, Iraq

GRD-PCO Comments. The title of the project is Nasiriyah Fire Station.

SIGIR's Response. The final report reflects the title change.

2. **Draft Report.** (Page 1, Contract, Task Order and Costs)

There was one modification to the contract W917BK-05-C-0008. Modification #A00001, issued 4 July 2005, extended the contract duration from 90 calendar days to 240 calendar days. The contract completion date shall be extended an additional 150 days, from 15 May 2005 to 12 October 2005. The contract price remains unchanged.

GRD-PCO Comments. There were a total of three modifications. Modification R0002 was a no cost change modification that included additional work for liquidated damages. Modification R0004 was a no cost change to modification R0002 that extended the contract completion date by 179 days and established a closeout date of 08 April 2006.

SIGIR's Response. The SIGIR assessment team in early April 2006, during our visit to the Adder Resident Office, was provided with contract information that only included one modification (#A00001, issued 4 July 2005). The final report includes discussion about the two additional modifications.

3. Draft Report. (Page 2. Scope of Work of the Contract)

The scope of work did not contain a driveway from the city street to fire station. The front of the fire station building site is approximately 125 m from the city street. Without a road, the trucks would have no paved access to and from the fire station. Prior to design and construction start, the contract Bill of Quantities, dated 29 November 2004, contained 500 square meters (m²) for paving an internal road network. The contractor's cost proposal, dated 29 November 2004, contained a price (\$8,000) for paving that was rolled up into the contractor's overall contract cost of \$508,800. A review of the contractor's design indicated the contractor did not include any road drawings or details showing any paving. In addition, based upon a review of the progress photos, and discussions with the USACE Project Engineer (PE), the contractor did not construct an internal road network as part of the project. In the contract files provided to the Special Inspector General for Iraq Reconstruction inspection team, there was no documentation to show the paving had been de-scoped from the contract. The USACE PE had taken over the management of the project several months earlier, and did not have first hand knowledge about the paving requirement.

GRD-PCO Comments. The original statement of work did not require a driveway. A base course driveway was added to the scope of work in Modification R0002. The Bill of Quantities (BOQ) referred to in the draft report appears to reference an IGE for the Al Jihad Fire Station, Basrah Province. The Al Jihad Fire Station IGE was used to develop the should-cost range for the Nasiriyah facility and it included an estimate for a driveway. We could not find the BOQ figure of \$8,000 referenced in the draft report in any of the documents provided by the contractor. We believe the contractor submitted a BOQ after the firm fixed price contract was awarded. Further, the contractor's schedule of values for progress payments did not contain a cost for paving. There was no documentation to show that paving was de-scoped from the contract as stated in the draft report, because the contract did not originally require a driveway.

SIGIR Response. Comments noted. The final report does not include references to the Bill of Quantities that pertained to paving.

4. Draft Report. (Page 13)

The QA Deficiency Log noted a few items associated with architectural work such as repainting and the setting of floor tile, most of which were corrected by the contractor at the time of turnover to the ICDD.

GRD-PCO Comments. The contractor has completed correction of "all" deficiencies.

SIGIR Response. The final report reflects the updated information provided by GRD-PCO.

5. Draft Report. (Page ii. Recommendations)

United States Army Corps of Engineers, Gulf Region Division should:

- Ensure the adequacy of the design; and
- Maintain a record of the design review and approval process.

GRD-PCO Actions Taken.

Ensure the adequacy of the design. Concur. On future Design Build contracts, Districts will follow the guidance provided in the Unified Facilities Criteria (UFC) 1-300-7a, Design Build Technical Requirements and UFC 1-300-9n, Design Procedure. These criteria and their references will be used to prepare the initial contract technical specifications regarding the detailed design requirements. Once the contract specifies the level of detail required, the design review team will ensure the design and specifications are adequate and meet the specified design requirements. Review and acceptance of the design will be documented.

Maintain a record of the design review and approval process. Concur. Procedures to record the design review process are in place and described in the GRD-PCO Standard Operating Procedure PR-110, Design Review, dated 04 December 04. Project Delivery Teams will review these procedures to ensure records for the design review and approval process are properly maintained. Further, Districts will use a “shared drive” to file automated copies of project data to include design review data. Record keeping on the shared drive will prevent loss of data and improve the transition for new employees.

SIGIR Response. Comments noted.

Appendix A. Scope and Methodology

We performed this project assessment from April through June 2006 in accordance with the Quality Standards for Inspections issued by the President's Council on Integrity and Efficiency. The assessment team included a professional engineer and an auditor. Official Security representatives would not escort the Inspection Team to the project site because they did not consider it to be safe at the time of our visit to the USACE Resident Office. Therefore, our project assessment relied solely on information obtained from:

- Review of contract documentation to include the following: Contract, Contract modifications, Contract documentation, and Statement of Work;
- Review of the design package (drawings and specifications), Quality Control Plan, Contractor's Quality Control Reports, United States Army Corps of Engineers Quality Assurance Reports, Construction Progress Photos, and Turnover Letters; and
- Interviews with the United States Army Corps of Engineers Area Engineer, Resident Engineer, and Project Engineer.

Appendix B. Acronyms

GRS	Gulf Region South
HVAC	Heating, Ventilation and Air Conditioning
ICDD	Iraq Civil Defense Directorate
km	Kilometer
m	Meter
QA	Quality Assurance
QAR	Quality Assurance Representative
QC	Quality Control
PE	Project Engineer
USACE	United States Army Corps of Engineers

Appendix C. Report Distribution

Department of State

Secretary of State

Senior Advisor to the Secretary and Coordinator for Iraq

U.S. Ambassador to Iraq

Director, Iraq Reconstruction Management Office

Inspector General, Department of State

Department of Defense

Secretary of Defense

Deputy Secretary of Defense

Director, Defense Reconstruction Support Office

Under Secretary of Defense (Comptroller)/Chief Financial Officer

Deputy Chief Financial Officer

Deputy Comptroller (Program/Budget)

Inspector General, Department of Defense

Department of the Army

Assistant Secretary of the Army for Acquisition, Logistics, and Technology

Principal Deputy to the Assistant Secretary of the Army for Acquisition,

Logistics, and Technology

Deputy Assistant Secretary of the Army (Policy and Procurement)

Assistant Secretary of the Army for Financial Management and Comptroller

Chief of Engineers and Commander, U.S. Army Corps of Engineers

Commanding General, Gulf Region Division

Auditor General of the Army

U.S. Central Command

Commanding General, Multi-National Force - Iraq

Commanding General, Joint Contracting Command – Iraq/Afghanistan

Commanding General, Multi-National Corps – Iraq

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Inspector General, Health and Human Services
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House Committee on Government Reform
 Subcommittee on Management, Finance and Accountability
 Subcommittee on National Security, Emerging Threats and International Relations
House Committee on International Relations
 Subcommittee on Middle East and Central Asia

Appendix D. Project Assessment Team Members

The Office of the Assistant Inspector General for Inspections, Office of the Special Inspector General for Iraq Reconstruction, prepared this report. The principal staff members who contributed to the report were:

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